

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)

1560-0462PUS1

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Signature _____

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name _____

Application Number

10/585,759

Filed

July 12, 2006

First Named Inventor

Takayasu YAMAZAKI

Art Unit

3656

Examiner

M. Johnson

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.

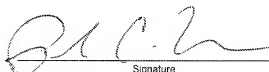
☐ assignee of record of the entire interest.

See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

☒ attorney or agent of record.
Registration number 43368

☐ attorney or agent acting under 37 CFR 1.34.

Registration number if acting under 37 CFR 1.34 _____



Signature

Paul C. Lewis

Typed or printed name

703-205-8000

Telephone number

April 8, 2010

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required.
Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of:
Takayasu YAMAZAKI et al.

Application No.: 10/585,759

Confirmation No.: 7895

Filed: July 12, 2006

Art Unit: 3656

For: RACK-AND-PINION STEERING
APPARATUS

Examiner: M. A. Johnson

PRE-APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Pre-Appeal Brief is being filed concurrently with a Request for a Pre-Appeal Conference.

Because this is the first formal reply to the Office Action mailed February 4, 2010, Applicants respectfully submit that the Interview Summary, Paper No. 20100129, accurately reflects the telephone interview conducted at the request of the Examiner.

Applicants respectfully request reconsideration and allowance of pending claims 5-9. Currently, independent claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Namiki, Umeyama, and Imase.

Independent claim 5 recites a rack-and-pinion steering apparatus including pinion teeth provided on a circumferential surface of a pinion shaft and rack teeth provided on an outer surface of a rack shaft, meshed with each other substantially without backlash, so as to transmit rotation of the pinion shaft connected to a steering member to the rack shaft via a mesh portion between the pinion teeth and the rack teeth, thus to move the rack shaft in an axial direction thereof at a predetermined stroke ratio for execution of steering operation, wherein the pinion

teeth are provided with a module m , a number of teeth z , a tooth depth h and a helix angle β that remain within the following respective ranges, while satisfying a pressure angle α being within a range of 24° to 30° and the stroke ratio:

module m : 1.8 to 2.0,

number of teeth z : 7 to 13,

tooth depth h : $2m$ to $2.5m$, and

helix angle β : 40° or smaller, and

wherein a trochoid interference clearance of the rack teeth and pinion teeth is positive.

Applicants respectfully submit that this combination of elements as set forth in independent claim 5 is not disclosed or made obvious by the prior art of record, including Namiki, Umeyama, and Imase.

The Examiner alleges that Namiki discloses the claimed invention except for the identical ranges. In fact, the Examiner alleges that Namiki discloses that the number of teeth being between 7 and 13. Applicants respectfully disagree. Clearly from Fig. 7 there are four teeth.

Moreover, the Examiner, citing *In re Aller*, further states that it would be obvious to one of ordinary skill in the art to select these ranges because "it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art." Applicants respectfully submit that under this interpretation, no improvement of a toothed gear will be patentable because all toothed gears will have a module, a number of teeth, a tooth depth, and a helix angle and therefore any variations thereof would be obvious. Clearly, this is not what is intended by *In re Aller*.

Rather, regarding *In re Aller*, Applicants note that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." M.P.E.P. § 2144.05(II)(B). In determining whether or not such experimentation is within the teachings of the art, the Examiner "must be ever alert not to read obviousness into an invention on the basis of the [Applicants'] own statements; that is, we must view the prior art without reading into that art [Applicants'] teachings." *In re Spinnoble*, 405 F.2d 578, (CCPA 1969).

There is nothing in Namiki to suggest that the number of teeth, tooth depth, and module are result effective variables. And while Umeyama disclose various gears having various number of

teeth, various tooth depths, and various Normal modules, the number of teeth are significantly greater than the claimed number of teeth and the end result of the various parameters are gears having a significantly higher transverse contact ratio than that of Namiki.

In particular, Namiki discloses that when a rack-and-pinion has a transverse contact ratio $\epsilon_s \leq 1$, the rack is kept free of rocking and inclination, and thus free from biting. See col. 5, ll. 29-32. In contrast to Namiki, the tooth specifications of Umeiyama result in backlash. See for example the exemplary gears detailed in Tables 1 and 2, all of which disclose a transverse contact ratio of 1.60 or greater. Consequently, one of ordinary skill in the art would not look to Umeiyama to modify Namiki to provide the claimed rack-and-pinion gear because Namiki specifically discloses a transverse contact ratio $\epsilon_s \leq 1$.

Therefore, for at least this reason, one of ordinary skill in the art would not have derived the claimed invention based on the hypothetical combination of Namiki, Umeiyama, and Imase.

Moreover, as conceded by the Examiner, Namiki fails to disclose a trochoid interference clearance of the rack teeth and pinion teeth being positive. The Examiner turns to Imase to allegedly teach the combination. The Examiner has directed Applicant's attention to Figs. 1, 6, and 7, which describe rollers 6 and rack teeth 4.

Applicants respectfully submit that Imase is directed to a rack and pinion structure where either the pinion or the rack is composed of a plurality of rollers. The purpose of using a roller is to obviate the inconvenience caused by a structure in which **a tooth meshes with another tooth**. Compare col. 1, ll. 31-35 to Figs. 18, 19, and col. 1, ll. 18-30. In other words, Imase is directed at a rack and a pinion that overcomes the problems of **meshing teeth** (e.g., the teeth of Namiki and Umeiyama).

If anything, Imase would suggest to one of ordinary skill in the art the desirability of replacing the teeth of a rack and pinion with rollers. Accordingly, it cannot be said that Imase teaches or suggest providing a trochoid interference clearance of **rack teeth** and **pinion teeth** being positive. Therefore, one of ordinary skill in the art would not look to Imase to teach modifying a hypothetical combination of Namiki and Umeiyama further to provide a positive trochoid interference clearance of the rack teeth and pinion teeth.

For at least this additional reason, Applicants respectfully submit that the rejection of independent claim 5 over Namiki, Umeiyama, and Imase is improper.

Accordingly, Applicants respectfully request reconsideration and allowance of claims 5-9.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

Dated: April 8, 2010

Respectfully submitted,

By 

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